APPENDIX D

July 2006 – June 2007 Coating, Thinner, and Cleaning Material Emissions Data
(Electronic Format)

APPENDIX E

2007 Modeling Protocol, IDEQ Correspondence of Protocol Approval

American Geosciences, Inc.

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September 17, 2007

Mr. Kevin Schilling
Airshed Dispersion Modeling Coordinator
Idaho Department of Environmental Quality
State Office
Air Quality Division
1410 North Hilton
Boise, Idaho 83706

Re: Air Dispersion Modeling Protocol
Tier II Operating Permit T2-060031 Renewal
MotivePower, Inc., a Wabtec Company
Boise, Idaho
AGI Project No. 99092-006

Dear Mr. Shilling:

MotivePower, Inc. (MPI), a Wabtec Company will be submitting to the Idaho Department of Environmental Quality (IDEQ) a Tier II Operating Permit Renewal application for their facility in Boise, Idaho. American Geosciences, Inc. (AGI) has prepared this dispersion modeling protocol. This letter is intended to fulfill the requirements for a dispersion modeling protocol in support of the permit renewal.

Project Description and Purpose of Modeling

As currently identified in the Tier II Operating Permit (OP) (Permit No. T2-060031) issued November 5, 2002, and revised December 18, 2006, the MotivePower facility is comprised of two individual facilities that are located approximately one mile apart and operate in Boise, Ada County, Idaho. The MotivePower Apple Street facility (MPAS) is located at 4600 Apple Street, and the Truck and Engine Annex (TEA) is located at 2100 Braniff Street. Generally, MPAS is located at UTM Zone 11, 567,150 meters Easting, 4,822,950 meters Northing, and the TEA is generally located at UTM Zone 11, 568,100 meters Easting, 4,822,350 meters Northing. However, both have historically been considered a single facility with respect to permitting and dispersion modeling.

After discussions with IDEQ permitting staff, rather than renewing the existing Tier II OP, MPI has chosen to replace the permit with new Permits-to-Construct (PTC) in order to increase the allowable paint usage at paint shops located at the MPI facilities, and increase the number of locomotives produced. As such, the increase in potential emissions requires that a dispersion modeling analysis be performed in support of the permit application. Emissions from the facility include particulate matter (PM and PM-10) from painting operations, natural gas combustion, and blasting of parts for cleaning purposes; nitrogen oxides (NOx), sulfur dioxide (SO_2), and carbon monoxide (CO) from natural gas combustion; volatile organic compounds (VOC) from natural gas combustion and painting operations; and hazardous air pollutants (HAP) and toxic air pollutants (TAP) from painting operations.

DESCRIPTION OF EMISSIONS QUANTITIES

Table I summarizes the potential-to-emit calculation summary for the proposed modification of operations at MPI. Please note, these emission estimates are not yet finalized, and may be modified prior to the final modeling analysis. A comprehensive summary of the desired permitted emission rates used in the analysis will be thoroughly described in the modeling summary.

Table I
Potential to Emit
(tons per year)

Totals in Tons per Year	PM	PM-10	NOx	CO	SO2	VOC	HAP	Lead
Painting Operations at MPAS and TEA								
All Paint Booths *- South Large Paint Shop (Booth 1 & 2)* *- North Large Paint Shop (Booth 3 & 4)* *- SWBP Building (Booth 5)* *- Small Paint Shop (Booth 6)* *- Spray Paint Booth, TEA Annex (Booth 7)* *- East Paint Shop (Booth 8 & 9)*	0.17	0.11				59.73	23.73	
Other Emission Sources								
Seller Boiler No. 1 or No. 2	0.22	0.22	2.88	2.42	0.02	0.16		
SWBP Shot Blasting	0.65	0.23						1.44E-04
TEA Shot Blasting	6.62	2.31						1.47E-03
Main Facility Bead Blasting	0.12	0.12						
TEA Bead Blasting	0.12	0.12						
Locomotive Engine Test Cell Stand	2.84	2.84	80.87	11.76	7.98	6.48		
Compressor Test Stand Engine	0.47	0.47	6.65	1.43	0.44	0.54		
All Natural Gas Emissions	0.47	0.47	6.24	5.24	0.04	0.34		
Generator Diesel Fuel Emissions	0.01	0.01	0.09	0.02	0.01	0.01		
Fire Pump Diesel Fuel Emissions	0.08	0.08	1.11	0.24	0.07	0.09		
LPG Heater Emissions	0.00	0.00	0.11	0.02	0.00	0.00		
Total Emissions (tons per year)	**11.68**	**6.89**	**96.63**	**20.85**	**8.47**	**67.26**	**23.73**	**1.62E-03**

MODELING APPLICABILITY ASSESSMENT

Based on discussions with IDEQ staff, MPI will be required to determine the ambient air impacts from the proposed change to operations at their facilities. As such, the proposed increase in operations at MPI requires a refined dispersion modeling analysis for criteria pollutants and for any TAPs that exceed the respective screening emission levels (EL) as outlined in IDAPA 58.01.01.585 and .586.

Criteria pollutant emission rates from sources other than the paint booths will remain unchanged from the 2006 permitting process, i.e. natural gas and diesel consumption, blasting etc. Potential emission rates of TAPs are based on data collected from operations at MPI from July 2006 through June 2007 and scaled to the paint consumption rate proposed in the application (19,500 to 26,750 gallons).

Criteria Pollutant Modeling Applicability

Based on guidance from IDEQ staff, a Full Impact Analysis will be required in support of the Tier II OP renewal/replacement with PTCs. MPI will include all non-exempt sources of criteria pollutants to determine the ambient air impacts for the proposed modification. IDEQ has indicated that there are relevant surrounding sources that will also be included in the analysis (Treasure Valley Forest Products and an unnamed mineral processing plant). MPI expects that IDEQ will be providing specifics of these sources with the response to this protocol; the additional non-MPI sources will then be added to the modeling analysis. In addition, IDEQ has indicated that PM-10 emissions from the engine load testing, while considered a mobile source and not subject to permitting, must be accounted for by either the addition of a factor previously determined by IDEQ or it must be modeled explicitly with the other sources. Therefore, emissions from the engine load testing will be included in this analysis.

TAPs Modeling Applicability

Table II provides the summary of potential hourly TAP emission rate increases and their respective screening emission level (EL). The estimated potential TAP emission rate increases are based on the proposed permit modifications. For TAP emission rate increases that exceed the relevant EL, MPI will perform a refined modeling analysis to ensure that the predicted impact is equal to or below thresholds in IDAPA 58.01.01.585 and .586. Only the net increase in potential emissions over previously modeled TAP emission rates will be compared to their respective EL. This methodology is consistent with guidance provided by IDEQ modeling staff.

Table II
Toxic Air Pollutants

Toxic Air Pollutant	CAS Number	24 Hour Max (200 gallon/day) (lb/hr)	EL (lb/hr)
1,2,4-Trimethyl benzene	95-63-6	0.0779	8.2
1,6-Hexamethylene Diisocyanate	**822-06-0**	**0.0125**	**0.002**
1-Methoxy-2-propyl acetate	108-65-6	0.1735	24
Acetone	67-64-1	0.9811	119
[1] Amorphous silica	7631-86-9	0.0002	0.667
Bis(2-ethylhexyl)phthalate(DEHP)	**117-81-7**	**0.0286**	**0.028**
Butyl acetate	123-86-4	3.6564	47.3
Butyl alcohol	35296-72-1	1.6143	10
[1] Carbon black	1333-86-4	0.0004	0.23
[1] Cristobalite	14464-46-1	0.0006	0.0033
Diisobutyl ketone	108-83-8	0.8385	9.67
Dipropylene glycol methyl ether	34590-94-8	0.0013	40
Ethyl acetate	141-78-6	2.1520	93.3
Ethylbenzene	100-41-4	2.2817	29
Ethylene Glycol Monobutyl Ether	111-76-2	1.7483	8
Heptane	142-82-5	0.0449	109
Isobutyl acetate	110-19-0	0.3588	46.7
Isophorone diisocyanate	**4098-71-9**	**0.0062**	**0.006**
Isopropyl alcohol	67-63-0	0.2524	65.3
[1] Kaolin	1332-58-7	0.0053	0.133
Methanol	67-56-1	5.0342	17.3
Methyl acetate	79-20-9	0.5250	40.7
Methyl amyl ketone	110-43-0	3.8995	15.7
Methyl ethyl ketone	78-93-3	1.2630	39.3
Methyl isoamyl ketone	110-12-3	0.1382	16
Methyl propyl ketone	107-87-9	0.6426	46.7
[1] Methylene chloride (Dichloromethane)	75-09-2	1.02E-06	0.0016
Mica	12001-26-2	0.0085	0.2
Naphthalene	91-20-3	0.0010	3.33
Petroleum distillate	8032-32-4	2.1293	91.3
Petroleum distillate a (Stoddard Solvent)	8052-41-3	1.6333	35
Petroleum distillate b	8032-32-4	0.0580	91.3
Propylene glycol monomethyl ether acetate	108-65-6	0.2690	24
[1] **Quartz-crystalline silica**	**14808-60-7**	**0.0076**	**0.0067**

Table II cont.

Toxic Air Pollutant	CAS Number	24 Hour Max (200 gallon/day) (lb/hr)	EL (lb/hr)
Styrene	100-42-5	0.0572	6.67
Toluene	108-88-3	12.0348	25
Xylene	1330-20-7	8.6172	29
[2] Cadmium	**NA**	**2.88E-05**	**3.7E-06**
[2] Manganese	NA	3.40E-05	0.333
[2] Nickel	**NA**	**1.13E-04**	**2.7E-05**

1-Because these are non-volatile TAPs, the EL was calculated by multiplying the hourly rate times the transfer efficiency of 40% and by the minimum PM10 paint booth filter control rate of 99.58%.
2- These TAPs are emitted by the TEA Shot Blast Booth.

MODELING ANALYSES METHODOLOGY

Model Selection

The dispersion modeling will be performed utilizing the AMS/EPA Regulatory Model (AERMOD) to determine compliance with relevant IDEQ and Environmental Protection Agency (EPA) ambient air quality standards. MPI will utilize AERMOD Version 9.63 in the BEEST Suite created by Beeline-Software, of Austin, Texas. AGI's arrangement with Beeline-Software ensures that the newest version of AERMOD is available for use shortly after approval by EPA.

Criteria Pollutant Modeling Methodology

MPI will include all non-exempt sources and appropriate surrounding sources of criteria pollutants in the Full Impact Analysis to determine the ambient air impacts for the proposed modification. The predicted ambient air impacts will be compared to the ambient air quality standards outlined in IDAPA 58.01.01.577, and as shown in Table III. The predicted impacts will be added to any ambient background pollutant concentrations. MPI expects that IDEQ will provide these concentrations.

Table III
IDAPA Ambient Air Quality Standards

Pollutant	Averaging Period	Standard ($\mu g/m^3$)
PM-10	Annual [1]	50
PM-10	24-Hour [2]	150
SO_2	Annual [1]	80
SO_2	24-Hour [2]	365
SO_2	3-Hour [2]	1,300
NOx	Annual [1]	100
CO	8-Hour [2]	10,000
CO	1-Hour [2]	40,000

1-Not to be exceeded in any calendar year.
2- Not to be exceeded more than once per calendar year.

TAPs Modeling Methodology

Each TAP potential emission rate was based on the actual emissions and the associated paint consumption during the period of July 2006 through June 2007. Since the South Large Paint Shop (Booths 1 and 2) and the North Large Paint Shop (Booths 3 and 4) result in a significant proportion of paint consumption, the emission rates of TAPs from these booths were compared to their individual EL. As such, these emission rates will be used to determine TAP compliance with IDEQ's Acceptable Ambient Concentrations (AAC) for non-carcinogenic compounds and the Annual Acceptable Ambient Concentrations (AACC) for carcinogenic compounds. Refer to Table II for specific TAP emission rates.

MODEL INPUT DATA

Table IV provides a summary of emission sources to be included in the dispersion modeling analysis.

Table IV
MotivePower Emission Sources

Emission Point Description	UTM Easting (meters)	UTM Northing (meters)	Emission Point Description	UTM Easting (meters)	UTM Northing (meters)
Seller Boilers	567,335	4,822,863	TEA Spray Paint Booth 7	568,056	4,822,395
South Paint Shop Booth 1	566,987	4,822,835	East Paint Shop Booth 8	567,297	4,822,953
South Paint Shop Booth 1	566,987	4,822,843	East Paint Shop Booth 8	567,294	4,822,942
South Paint Shop Booth 2	567,029	4,822,843	East Paint Shop Booth 9	567,303	4,822,951
South Paint Shop Booth 2	567,030	4,822,835	East Paint Shop Booth 9	567,299	4,822,941
North Paint Shop Booth 3	566,970	4,822,871	SWBP Blasting/Heater	567,286	4,823,018
North Paint Shop Booth 3	566,973	4,822,881	Locomotive Engine Test Cell	568,129	4,822,336
North Paint Shop Booth 4	567,025	4,822,866	TEA Shot Blast Booth	568,037	4,822,389
North Paint Shop Booth 4	567,022	4,822,855	Locomotive Shop Steam Cleaner	567,316	4,822,812
SWBP Paint Booth 5	567,280	4,823,007	Small Paint Shop Steam Cleaner	567,187	4,822,967
SWBP Paint Booth 5	567,283	4,823,015	Component Shop Furnace	567,185	4,822,892
Small Paint Shop Booth 6	567,178	4,822,972	TEA PROCECO Parts Washer	568,077	4,822,404
Small Paint Shop Booth 6	567,187	4,822,972	Maxom Tube-O-Therm	567,313	4,822,799

Prior dispersion modeling analyses for this facility have included sources that meet the Applicability Criteria in IDAPA 58.01.01.317.01.b (5) and (18) as "presumptively insignificant emission units." These insignificant activities are defined as "trivial" by the IDEQ Modeling Guideline and are generally not required to be included in the modeling analysis. As such, MPI will not include these sources in the analysis, but the emissions from these combustion sources have been included in the potential-to-emit calculations. MPI is requesting that IDEQ clarify if both the emergency generator for the fire water pump and the backup generator need to be included in the modeling analysis, as both generators meet exemption requirements in IDAPA 58.01.01.222.01.

Meteorological Data

IDEQ provided five years (1988-1992) of meteorological data to be used in the analysis. The preprocessed and AERMOD ready surface (*.SFC) and profile (*.PFL) files are based on data collected at the Boise, Idaho airport.

Emissions Release Parameters

Table V summarizes the emission release parameters of each emission point. Please note the emission point characteristics are unchanged from prior modeling analyses approved by IDEQ. For sources with an interrupted vertical release due to a rain cap, the exit velocity has been set to 0.001 m/s, consistent with prior IDEQ guidance. In addition, the Building Profile Input Program–Prime (BPIP-Prime) feature within the BEEST program will be utilized in order to account for building downwash.

Table V
Emissions Release Parameters

Emission ID	Emission Point Description	Elevation (meter)	Stack Height (feet)	Temperature (F)	Velocity (m/s)	Diameter (feet)
BOILER1	Seller Boilers	878.8	16.0	400.0	19.84	1.50
BOOTH_1A	South Paint Shop Booth 1	878	31.0	80.0	0.001	3.00
BOOTH_1B	South Paint Shop Booth 1	877.9	31.0	80.0	0.001	3.00
BOOTH_2A	South Paint Shop Booth 2	878.1	27.0	80.0	0.001	3.00
BOOTH_2B	South Paint Shop Booth 2	878.1	27.0	80.0	0.001	3.00
BOOTH_3A	North Paint Shop Booth 3	876.9	39.0	80.0	0.001	3.00
BOOTH_3B	North Paint Shop Booth 3	877	39.0	80.0	0.001	3.00
BOOTH_4A	North Paint Shop Booth 4	878.1	39.0	80.0	0.001	3.00
BOOTH_4B	North Paint Shop Booth 4	878.1	39.0	80.0	0.001	3.00
BOOTH_5A	SWBP Paint Booth 5	878.1	37.5	68.0	0.001	3.00
BOOTH_5B	SWBP Paint Booth 5	878.1	35.0	68.0	0.001	3.00
BOOTH_6A	Small Paint Shop Booth 6	878	23.0	68.0	0.001	4.00
BOOTH_6B	Small Paint Shop Booth 6	878.1	23.0	68.0	0.001	4.00
BOOTH_7	TEA Spray Paint Booth 7	893.1	35.0	68.0	0.001	3.50
BOOTH_8A	East Paint Shop Booth 8	878.1	36.0	80.0	0.001	3.00
BOOTH_8B	East Paint Shop Booth 8	878.1	36.0	80.0	0.001	3.00
BOOTH_9A	East Paint Shop Booth 9	878.1	36.0	80.0	0.001	3.00
BOOTH_9B	East Paint Shop Booth 9	878.1	36.0	80.0	0.001	3.00
SWBPBLST	SWBP Blasting/Heater	878.1	7.0	68.0	19.5	3.10
LOCOTEST	Locomotive Engine Test Cell	893.5	20.0	615.0	29.8	2.00
TEASHOTB	TEA Shot Blast Booth	893.1	15.0	68.0	15	1.90
LOCOBOIL	Locomotive Shop Steam Cleaner	882.1	32.0	200.0	0.001	1.33
SMPTBOIL	Small Paint Shop Steam Cleaner	878.1	6.0	200.0	0.001	41.25
COMPHEAT	Component Shop Furnace	878.1	28.0	325.0	5.9	1.33
TEAPROCE	TEA PROCECO Parts Washer	893.1	16.0	260.0	4.1	0.83
MAXOTUBE	Maxom Tube-O-Therm	885.1	7.0	100.0	10.7	0.50

Elevation Data

The AERMAP feature of AERMOD was used to determine the appropriate domain for this modeling exercise. Based on the proposed receptor grid, the domain for this project consists of the following USGS 7.5-minute quadrangles: Boise South, Boise North, Indian Creek Reservoir, Lucky Peak, Owyhee, and Robie Creek. The digital elevation model (DEM) files were obtained from Micropath Corporation of Golden, Colorado. Due to the addition of surrounding sources, previously approved receptor grid spacing might be inadequate to ensure determination of maximum impacts. As such, MPI proposes the following resolution as an initial grid, and ensuing model iterations will refine the grid around "hot spots." Receptors will be spaced at 25 meters along and out to 50 meters from the property boundary, 50 meters out to 200 meters from the fence line, and 100 meters out to 2000 meters. If surrounding sources are located in excess of 2,000 meters from MPI, the larger grid will be expanded to envelope these sources. If a different receptor grid is required, MPI requests that IDEQ provide an alternative to the proposed resolution.

CONCLUSION

Since the Tier II OP expires on November 5, 2007, MPI would like to initiate the dispersion modeling analysis in order to complete the permit application as soon as possible to ensure compliance with this deadline. If you have any questions, comments, or additions regarding this protocol, please contact me at (724) 733-7000 or amartinkus@amergeo.com at your convenience.

Sincerely,

AMERICAN GEOSCIENCES, INC.

Aaron A. Martinkus
Chemical Engineer

amm/bmh

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

1410 NORTH HILTON, BOISE, ID 83706 · (208) 373-0502

C. L. "BUTCH" OTTER, GOVERNOR
TONI HARDESTY, DIRECTOR

October 12, 2007

Aaron A. Martinkus
Chemical Engineer
American Geosciences, Inc.

RE: Modeling Protocol for the MotivePower, Inc. Facility Located in Boise, Idaho

Dear Aaron:

DEQ received your dispersion modeling protocol on September 17, 2007. The modeling protocol was submitted on behalf of MotivePower, Inc, a Wabtec Company (MotivePower), located in Boise, Idaho. The modeling protocol proposes methods and data for use in the ambient impact analyses of a Permit to Construct application for modification to increase paint usage and the number of locomotives processed at the facility and to renew the facility's Tier II operating permit, which will expire on November 5, 2007. This PTC will replace the expiring Tier II operating permit.

The modeling protocol has been reviewed and DEQ has the following comments:

- Comment 1: The protocol notes that several emissions units will not be included in the modeling demonstration under the justification that they are either trivial sources as discussed by the Idaho DEQ Modeling Guideline, are listed as sources in IDAPA 58.01.01.317.01.b(5) and (18) as presumptively insignificant emission units, or are emission units that meet the exemption requirements listed in IDAPA 58.01.01.222.01.

  This project is, in part, a facility-wide PTC that will replace the expiring Tier II operating permit. All emission units not considered as "trivial" by the modeling guideline must be included in the facility-wide NAAQS compliance demonstration. Some of the emissions units at the MotivePower facility may be considered trivial for the facility-wide NAAQS compliance demonstration, but this determination is done on a case-by –case basis, and may be pollutant-specific.

  DEQ requests that MotivePower list each emissions unit and quantify the potential short term and long term emission rates of each pollutant for DEQ to consider accepting the emissions unit as a trivial source. An addendum to the protocol may be needed to resolve which units are trivial for modeling. Note that emergency electrical generators and emergency fire water pumps are often operated for several consecutive hours during a given day, but are only operated a few hundred hours out of an annual period. The ambient impact contributions of such sources may be very small for annual ambient standards, but can be significant for ambient standards with short averaging periods.

- Comment 2: The application should provide documentation and justification for stack parameters used in the modeling analyses, clearly showing how stack gas temperatures and flow rates were estimated. Include calculations and assumptions. In most instances, applicants should use typical parameters, not maximum temperatures and flow rates.

Comment 3: The proposed receptor grid appears reasonable. However, it is the applicant's responsibility to use a sufficiently tight receptor network such that the maximum modeled concentration is reasonably resolved. If DEQ conducts verification modeling analyses with a tighter receptor grid and compliance with standards is no longer demonstrated, the permit will be denied.

- Comment 4: When modeling carcinogenic TAPs, the applicant may use a 5-year meteorological data set, using the period average concentration, rather than five separate 1-year data sets.

- Comment 5: DEQ determined that default background concentrations for urban areas for annual PM_{10}, CO, SO_2, and lead are most appropriate for the site location in Boise. The 24-hour PM_{10} background concentration is based on an airshed modeling result during a wintertime stagnation episode at this facility's location. The annual NO_2 background concentration is based on Boise area ambient monitoring data. DEQ's recommended background concentrations are: PM_{10} 24-hr = 84 $\mu g/m^3$; PM_{10} annual = 27 $\mu g/m^3$; CO 1-hr = 15,600 $\mu g/m^3$; CO 8-hr = 5,200 $\mu g/m^3$; NO_2 annual = 40 $\mu g/m^3$; SO_2 3-hr = 120 $\mu g/m^3$; SO_2 24-hr = 40 $\mu g/m^3$; SO_2 annual = 10 $\mu g/m^3$; and, Pb quarterly = 0.04 $\mu g/m^3$.

- Comment 6: Provide a complete, scaled facility plot plan that includes the locations of all emissions sources and buildings with the permit application. All building dimensions must be included either in the plot plan or in a table.

- Comment 7: Please include all modeling files, including the BPIP input file and the modeling runs using the coarse grid.

- Comment 8: Provide a detailed description of the determination of the ambient air boundary. The facility must prevent public access inside the ambient air boundary using methods described in the *Idaho Air Modeling Guideline.*

- Comment 9: DEQ permitting staff has not reviewed the emission inventory submitted in the modeling protocol for completeness and accuracy. Review will be conducted after the official permit application is received by DEQ.

- Comment 10: DEQ requests that Motive Power model the ambient impacts of two neighboring facilities that are co-contributing sources for the 24-hour and annual PM_{10} standards. The DEQ will provide you the electronic copies of the modeling input files for the Treasure Valley Forest Products-Yamhill facility and the Central Paving facility, which consists of a rock crushing plant and a hot-mix asphalt plant. Emission unit location, ambient air boundary, pollutant emission rates, and exhaust physical parameters are included in the files. As allowed by EPA guidance, impacts from neighboring facilities are not included in the impact assessment for those receptors that are located on the neighboring facility's property from which the PM_{10} emissions originated.

DEQ's modeling staff considers the submitted dispersion modeling protocol, with resolution of the additional items noted above, to be approved. It should be noted, however, that the approval of this modeling protocol is not meant to imply approval of a completed dispersion modeling analysis. Please refer to the *State of Idaho Air Quality Modeling Guideline*, which is available on the Internet at http://www.deq.state.id.us/air/permits_forms/permitting/modeling_guideline.pdf, for further guidance.

To ensure a complete and timely review of the final analysis, our modeling staff requests that electronic copies of all modeling input and output files (including BPIP, raw meteorological data files, AERMET input and output files, and AERMAP input and output files) are submitted with an analysis report if a different dataset than provided to you by DEQ is used for this project. If you have any further questions or comments, please contact me at (208) 373-0536.

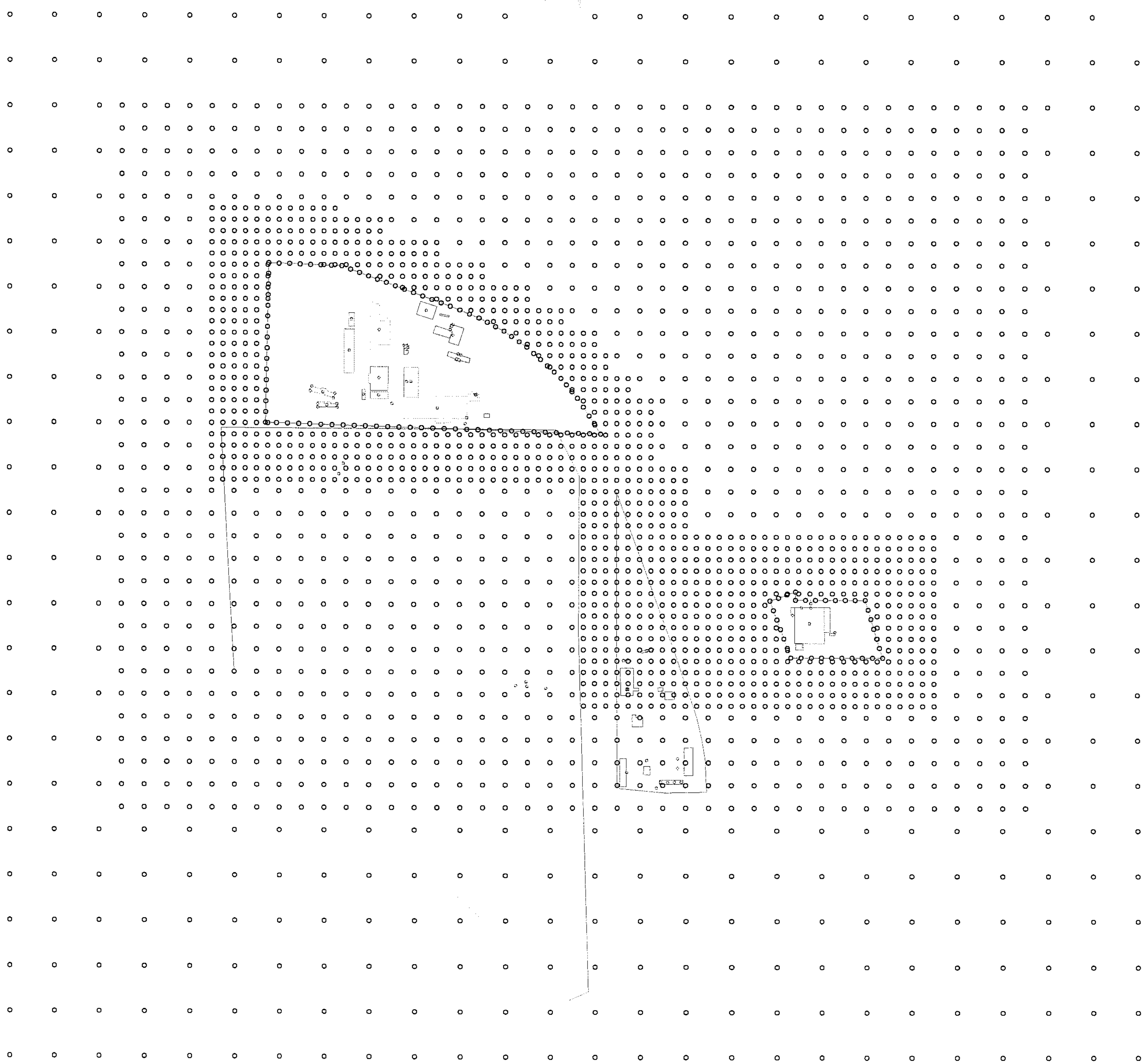
Sincerely,

Darrin Mehr
Air Quality Analyst
Idaho Department of Environmental Quality

APPENDIX F

Dispersion Modeling Receptor Grids and Output Files
(Electronic Format)

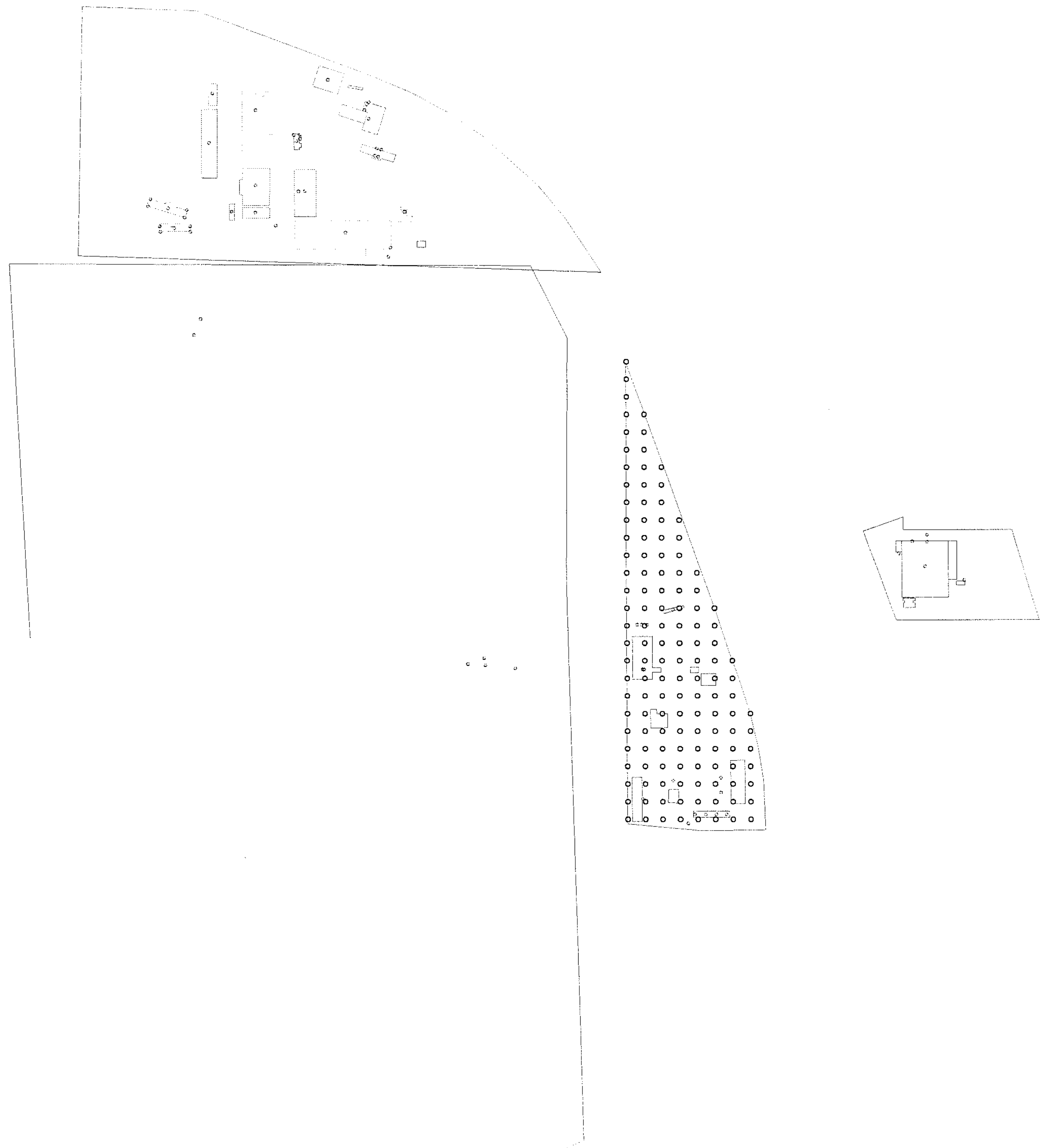
MotivePower Non PM-10 Impacts



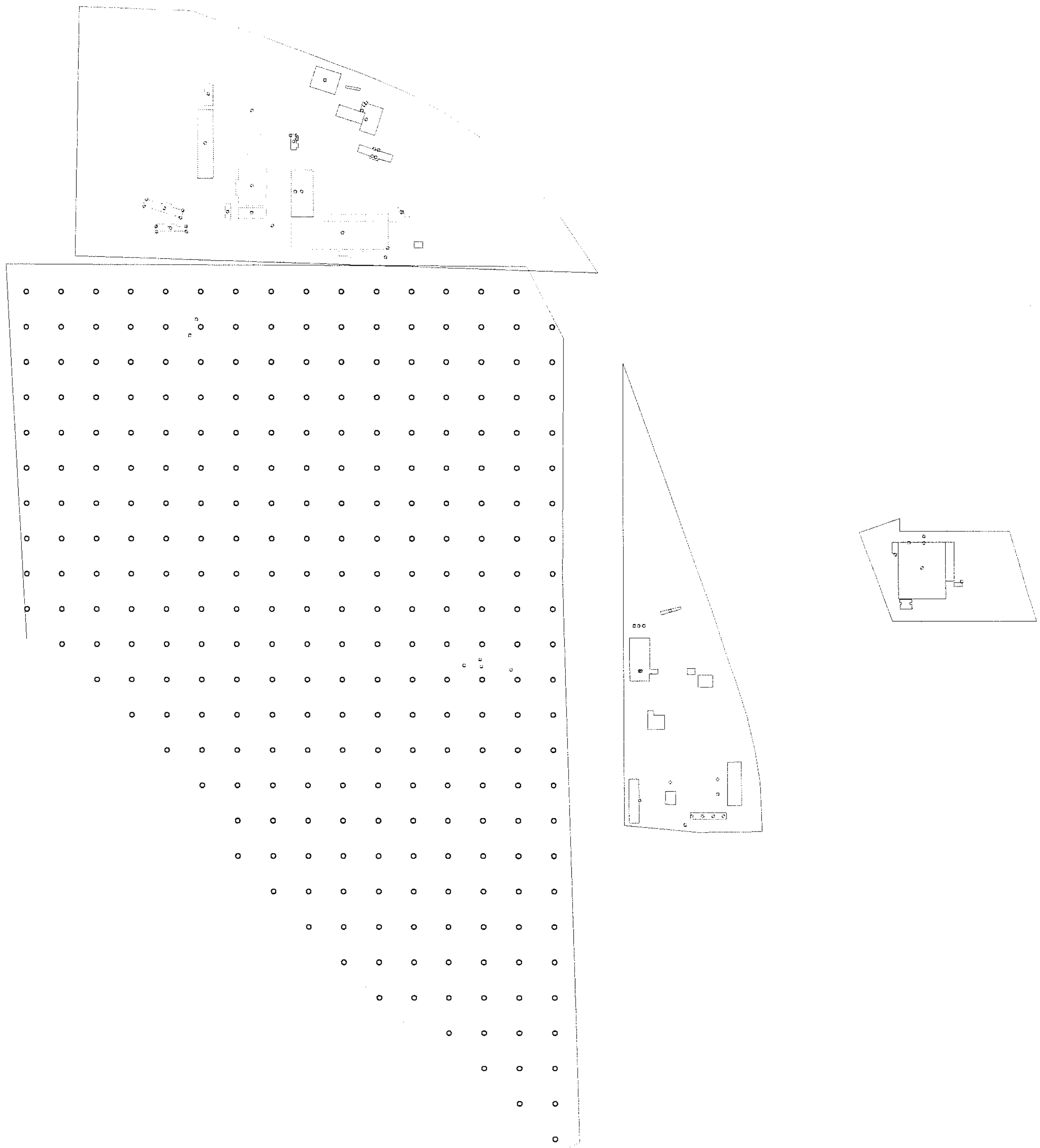
MotivePower PTC Renewal 2007

Scale: 1" = 304.6 Meters

MotivePower and Central Paving Facility Impacts on Treasure Valley Forest Products-Yamhill Facility



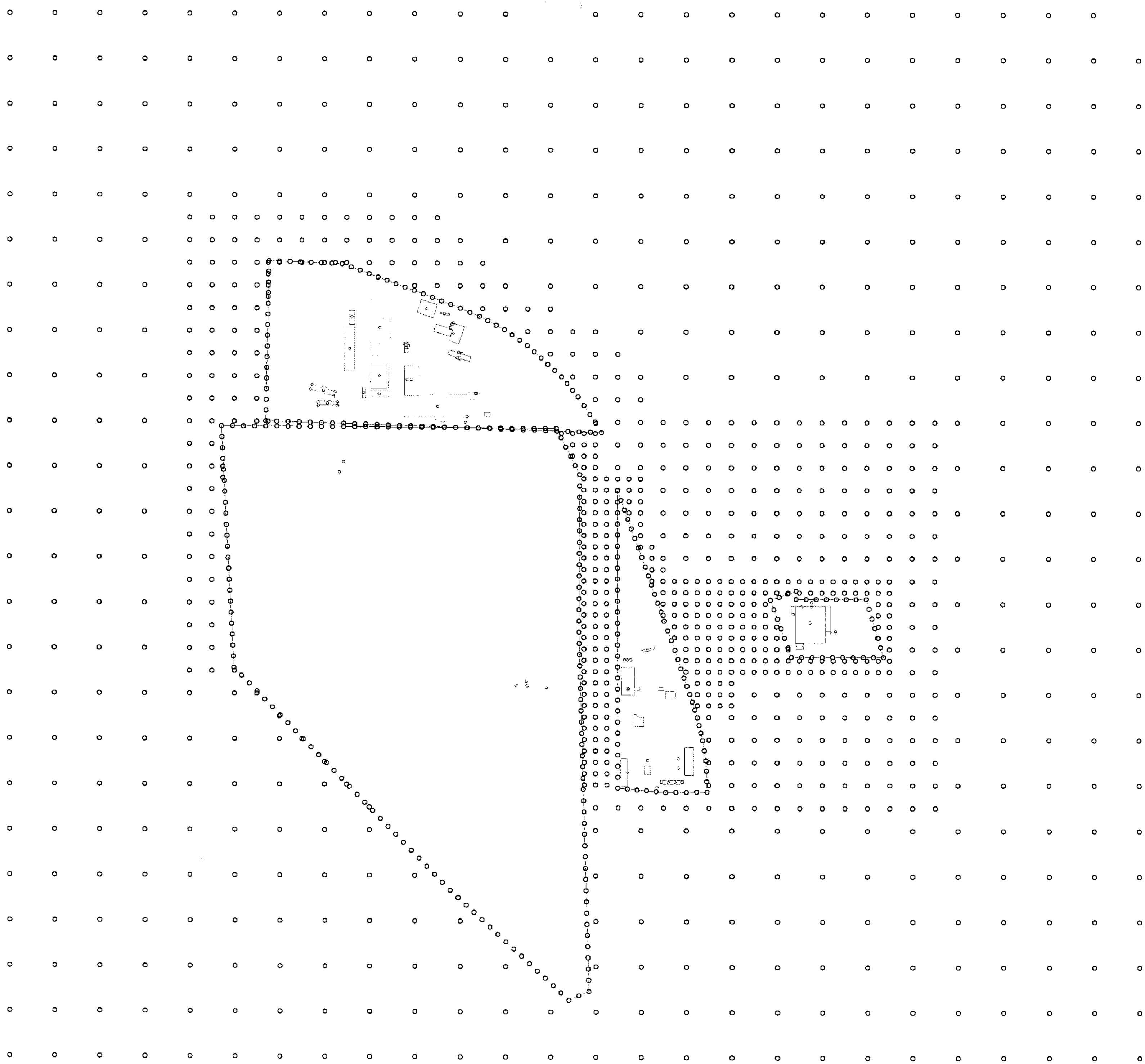
MotivePower and Treasure Valley Forest Products-Yamhill PM-10 Impacts on Central Paving



MotivePower PTC Renewal 2007

Scale: 1" = 215.7 Meters

MotivePower and Co-Contributing Sources - PM-10 Impacts



MotivePower PTC Renewal 2007

Scale: 1" = 304.6 Meters

APPENDIX G

EPA Guidance Documents

United States Environmental Protection Agency
Air and Radiation
EPA420-F-97-051
December 1997
Office of Mobile Sources

EPA

Technical Highlights

Emission Factors for Locomotives

The Environmental Protection Agency (EPA) has established emission standards for oxides of nitrogen (NOx), hydrocarbons (HC), carbon monoxide (CO), particulate matter (PM) and smoke for newly manufactured and remanufactured diesel-powered locomotives and locomotive engines, which have previously been unregulated. Three separate sets of emission standards have been adopted, with applicability of the standards dependent on the date a locomotive is first manufactured. The first set of standards (Tier 0) apply to locomotives and locomotive engines originally manufactured from 1973 through 2001. The second set of standards (Tier 1) apply to locomotives and locomotive engines originally manufactured from 2002 through 2004. The final set of standards (Tier 2) apply to locomotives and locomotive engines originally manufactured in 2005 and later. To analyze the environmental benefits expected from these new standards, EPA had to calculate emission factors for locomotives.

Estimated Baseline Freight Locomotive Emission Rates

In support of the rulemaking finalizing the locomotive emission standards, EPA has estimated average emission rates, given in grams per brake horsepower-hour (g/bhp-hr), for current uncontrolled locomotives. These estimates are shown in Table 1. It is important to note that there is significant variability in in-use emission rates. Table 2 shows the range of emission rates that have been reported for NOx and PM.

Table 1 - Estimated Baseline In-Use Emission Rates (g/bhp-hr)				
	HC	CO	NOx	PM
Line-Haul*	0.48	1.28	13.0	0.32
Switch**	1.01	1.83	17.4	0.44

* Line-haul locomotives over the line-haul duty-cycle
** Switch locomotives over the switch duty-cycle

Table 2 - Range of NOx and PM Emission Rates (g/bhp-hr)			
Line-Haul Cycle		Switch Cycle	
NOx	PM	NOx	PM
10.3-18.2	0.22-0.41	9.2-33.1	0.22-0.86

Conversion to Gram per Gallon Emission Factors

It is often useful to express emission rates as grams of pollutant emitted per gallon of fuel consumed (g/gal). This can be done by multiplying the emission rates in Table 1 by a conversion factor. EPA has estimated the appropriate conversion factor to be 20.8 bhp-hr/gal. These converted emission factors are shown in Table 3.

Table 3 - Converted Emission Factors (g/gal)				
	HC	CO	NOx	PM
Line-Haul	10	26.6	270	6.7
Switch	21	38.1	362	9.2

Projected Future Emission Factors

With the new national emission standards for both newly manufactured and remanufactured locomotives originally built after 1972, future locomotive emission rates are projected to be much lower than the baseline rates shown above. EPA's estimates of future emission rates for

Tier 0-Tier 2 locomotives are shown in Tables 4-6, respectively. Table 9 gives the expected fleet average emission factors for all locomotives, which reflects the penetration of the Tier 0-Tier 2 locomotives into the fleet over time.

Table 4 - Estimated Controlled Emission Rates for Locomotives Manufactured in 1973-2001 (Tier 0)

	HC		CO		NOx		PM	
	g/bhp-hr	g/gal	g/bhp-hr	g/gal	g/bhp-hr	g/gal	g/bhp-hr	g/gal
Line-Haul	0.48	10	1.28	26.6	8.6	178	0.32	6.7
Switch	1.01	21	1.83	38.1	12.6	262	0.44	9.2

Table 5 - Estimated Controlled Emission Rates for Locomotives Manufactured in 2002-2004 (Tier 1)

	HC		CO		NOx		PM	
	g/bhp-hr	g/gal	g/bhp-hr	g/gal	g/bhp-hr	g/gal	g/bhp-hr	g/gal
Line-Haul	0.47	9.8	1.28	26.6	6.7	139	0.32	6.7
Switch	1.01	21	1.83	38.1	9.9	202	0.44	9.2

Table 6 - Estimated Controlled Emission Rates for Locomotives Manufactured after 2004 (Tier 2)

	HC		CO		NOx		PM	
	g/bhp-hr	g/gal	g/bhp-hr	g/gal	g/bhp-hr	g/gal	g/bhp-hr	g/gal
Line-Haul	0.26	5.4	1.28	26.6	5.0	103	0.17	3.6
Switch	0.52	11	1.83	38.1	7.3	152	0.21	4.3

Emission Inventory Estimation

Total emissions can be calculated by multiplying the emission factors (in g/gal) by the fuel consumption rates (in million-gal/yr) to give annual emission rates (in metric tons per year). This metric estimate can be converted to standard tons (or short tons) per year, by multiplying it by 1.1.

In the United States, the great majority of fuel consumed by locomotives each year is used in line-haul freight service. Smaller amounts are also used in switching and passenger service. EPA's estimates of these fuel volumes are shown in Table 7. EPA's estimates of annual emission rates calculated from these fuel consumption rates are shown in Table 8.

Table 7 - 1996 Locomotive Fuel Consumption by Service Category (million gal/year)	
National Freight Line-Haul	3,331
National Freight Switching	270
Local and Regional Freight	215
Passenger	133

Table 8 - Estimated 1996 Nationwide Locomotive Emission Rates (thousand short tons per year)			
HC	CO	NOx	PM
47	119	1,202	30

For More Information

For further information on emission factors for locomotives, please write to:

U.S. Environmental Protection Agency
Engine Programs and Compliance Division
2565 Plymouth Road
Ann Arbor, MI 48105

Additional documents on locomotive emission standards are available electronically from the EPA Internet server at:

http://www.epa.gov/OMSWWW/locomotv.htm

or by calling (734) 668-4333.

Table 9 - Fleet Average Emission Factors For All Locomotives								
	(g/bhp-hr)				(g/gal)			
Year	HC	CO	NOx	PM	HC	CO	NOx	PM
1999	0.52	1.32	13.30	0.33	10.7	27.4	276.7	6.8
2000	0.52	1.32	13.16	0.33	10.7	27.4	273.8	6.8
2001	0.52	1.32	12.74	0.33	10.7	27.4	265.0	6.8
2002	0.52	1.32	11.96	0.33	10.7	27.4	248.8	6.8
2003	0.52	1.32	11.22	0.33	10.7	27.4	233.3	6.8
2004	0.51	1.32	10.49	0.33	10.7	27.4	218.1	6.8
2005	0.50	1.32	9.60	0.32	10.4	27.4	199.8	6.6
2006	0.48	1.32	8.92	0.31	10.1	27.4	185.6	6.4
2007	0.47	1.32	8.51	0.30	9.8	27.4	177.0	6.2
2008	0.46	1.32	8.29	0.29	9.6	27.4	172.5	6.0
2009	0.45	1.32	8.09	0.28	9.4	27.4	168.3	5.9
2010	0.44	1.32	7.84	0.28	9.1	27.4	163.0	5.7
2011	0.44	1.32	7.74	0.27	9.1	27.4	161.1	5.7
2012	0.43	1.32	7.62	0.27	8.9	27.4	158.5	5.6
2013	0.42	1.32	7.50	0.26	8.8	27.4	155.9	5.5
2014	0.42	1.32	7.37	0.26	8.7	27.4	153.4	5.4
2015	0.41	1.32	7.26	0.25	8.5	27.4	151.0	5.3
2016	0.40	1.32	7.14	0.25	8.4	27.4	148.5	5.2
2017	0.40	1.32	7.04	0.25	8.3	27.4	146.5	5.1
2018	0.39	1.32	6.94	0.24	8.2	27.4	144.4	5.1
2019	0.39	1.32	6.84	0.24	8.1	27.4	142.4	5.0
2020	0.38	1.32	6.75	0.24	7.9	27.4	140.3	4.9
2021	0.38	1.32	6.65	0.23	7.8	27.4	138.3	4.8
2022	0.37	1.32	6.56	0.23	7.7	27.4	136.4	4.7
2023	0.37	1.32	6.46	0.22	7.6	27.4	134.4	4.7
2024	0.36	1.32	6.37	0.22	7.5	27.4	132.5	4.6
2025	0.36	1.32	6.29	0.22	7.4	27.4	130.7	4.5
2026	0.35	1.32	6.20	0.21	7.3	27.4	129.0	4.4
2027	0.35	1.32	6.12	0.21	7.2	27.4	127.2	4.4
2028	0.34	1.32	6.04	0.21	7.1	27.4	125.6	4.3
2029	0.34	1.32	5.96	0.20	7.0	27.4	124.0	4.2
2030	0.33	1.32	5.88	0.20	6.9	27.4	122.3	4.2
2031	0.33	1.32	5.80	0.20	6.8	27.4	120.7	4.1
2032	0.32	1.32	5.73	0.19	6.7	27.4	119.2	4.0
2033	0.32	1.32	5.66	0.19	6.6	27.4	117.6	4.0
2034	0.31	1.32	5.58	0.19	6.5	27.4	116.1	3.9
2035	0.31	1.32	5.54	0.19	6.4	27.4	115.3	3.9
2036	0.31	1.32	5.52	0.19	6.4	27.4	114.9	3.9
2037	0.31	1.32	5.49	0.18	6.3	27.4	114.3	3.8
2038	0.30	1.32	5.47	0.18	6.3	27.4	113.7	3.8
2039	0.30	1.32	5.44	0.18	6.2	27.4	113.2	3.7
2040	0.30	1.32	5.41	0.18	6.2	27.4	112.6	3.7

United States Environmental Protection Agency

USER'S GUIDE FOR THE AMS/EPA REGULATORY MODEL - AERMOD

EPA-454/B-03-001

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TABLE 3-1.

SUMMARY OF SUGGESTED PROCEDURES FOR ESTIMATING

INITIAL LATERAL DIMENSIONS σ_{yo} AND

INITIAL VERTICAL DIMENSIONS σ_{zo} FOR VOLUME AND LINE SOURCES

Type of Source		Procedure for Obtaining Initial Dimension
(a) Initial Lateral Dimensions (σ_{yo})		
Single Volume Source	σ_{yo} =	length of side divided by 4.3
Line Source Represented by Adjacent Volume Sources (see Figure 1-8(a) in EPA, 1995)	σ_{yo} =	length of side divided by 2.15
Line Source Represented by Separated Volume Sources (see Figure 1-8(b) in EPA, 1995)	σ_{yo} =	center to center distance divided by 2.15
(b) Initial Vertical Dimensions (σ_{zo})		
Surface-Based Source ($h_e \sim 0$)	σ_{zo} =	vertical dimension of source divided by 2.15
Elevated Source ($h_e > 0$) on or Adjacent to a Building	σ_{zo} =	building height divided by 2.15
Elevated Source ($h_e > 0$) not on or Adjacent to a Building	σ_{zo} =	vertical dimension of source divided by 4.3

3.3.2.3 AREA Source Inputs

The AERMOD area source algorithm is used to model low level or ground level releases with no plume rise (e.g., storage piles, slag dumps, and lagoons). The AERMOD model uses a numerical integration approach for modeling impacts from area sources. When the TOXICS option is specified, the area source integration routine is optimized to reduce model runtime. This is accomplished by incorporation of a three-tiered approach using the Romberg numerical integration, a 2-point Gaussian Quadrature routine for numerical integration, or a point source approximation based on the location of the receptor relative to the source. In the regulatory default mode the Romberg numerical integration is utilized for all receptors.

data, output data, models used, justification of model selections, ambient monitoring data used, meteorological data used, justification for use of offsite data (where used), modes of models used, assumptions, and other information relevant to the determination of adequacy of the modeling analysis.

(f) Evidence, where necessary, that emission limitations are based on continuous emission reduction technology.

(g) Evidence that the plan contains emission limitations, work practice standards and recordkeeping/reporting requirements, where necessary, to ensure emission levels.

(h) Compliance/enforcement strategies, including how compliance will be determined in practice.

(i) Special economic and technological justifications required by any applicable EPA policies, or an explanation of why such justifications are not necessary.

2.3. Exceptions

2.3.1. The EPA, for the purposes of expediting the review of the plan, has adopted a procedure referred to as "parallel processing." Parallel processing allows a State to submit the plan prior to actual adoption by the State and provides an opportunity for the State to consider EPA comments prior to submission of a final plan for final review and action. Under these circumstances, the plan submitted will not be able to meet all of the requirements of paragraph 2.1 (all requirements of paragraph 2.2 will apply). As a result, the following exceptions apply to plans submitted explicitly for parallel processing:

(a) The letter required by paragraph 2.1(a) shall request that EPA propose approval of the proposed plan by parallel processing.

(b) In lieu of paragraph 2.1(b) the State shall submit a schedule for final adoption or issuance of the plan.

(c) In lieu of paragraph 2.1(d) the plan shall include a copy of the proposed/draft regulation or document, including indication of the proposed changes to be made to the existing approved plan, where applicable.

(d) The requirements of paragraphs 2.1(e)–2.1(h) shall not apply to plans submitted for parallel processing.

2.3.2. The exceptions granted in paragraph 2.3.1 shall apply only to EPA's determination of proposed action and all requirements of paragraph 2.1 shall be met prior to publication of EPA's final determination of plan approvability.

[55 FR 5830, Feb. 16, 1990, as amended at 56 FR 42219, Aug. 26, 1991; 56 FR 57288, Nov. 8, 1991]

APPENDIX W TO PART 51—GUIDELINE ON AIR QUALITY MODELS

PREFACE

a. Industry and control agencies have long expressed a need for consistency in the application of air quality models for regulatory purposes. In the 1977 Clean Air Act, Congress mandated such consistency and encouraged the standardization of model applications. The *Guideline on Air Quality Models* (hereafter, *Guideline*) was first published in April 1978 to satisfy these requirements by specifying models and providing guidance for their use. The *Guideline* provides a common basis for estimating the air quality concentrations of criteria pollutants used in assessing control strategies and developing emission limits.

b. The continuing development of new air quality models in response to regulatory requirements and the expanded requirements for models to cover even more complex problems have emphasized the need for periodic review and update of guidance on these techniques. Three primary on-going activities provide direct input to revisions of the *Guideline*. The first is a series of annual EPA workshops conducted for the purpose of ensuring consistency and providing clarification in the application of models. The second activity is the solicitation and review of new models from the technical and user community. In the March 27, 1980 FEDERAL REGISTER, a procedure was outlined for the submittal to EPA of privately developed models. After extensive evaluation and scientific review, these models, as well as those made available by EPA, are considered for recognition in the *Guideline*. The third activity is the extensive on-going research efforts by EPA and others in air quality and meteorological modeling.

c. Based primarily on these three activities, new sections and topics are included as needed. EPA does not make changes to the guidance on a predetermined schedule, but rather on an as needed basis. EPA believes that revisions of the *Guideline* should be timely and responsive to user needs and should involve public participation to the greatest possible extent. All future changes to the guidance will be proposed and finalized in the FEDERAL REGISTER. Information on the current status of modeling guidance can always be obtained from EPA's Regional Offices.

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1.0 INTRODUCTION

a. The *Guideline* recommends air quality modeling techniques that should be applied to State Implementation Plan (SIP) revisions for existing sources and to new source reviews (NSR), including prevention of significant deterioration (PSD). (*See* Ref. 1, 2, 3). Applicable only to criteria air pollutants, it is intended for use by EPA Regional Offices in judging the adequacy of modeling analyses performed by EPA, State and local agencies and by industry. The guidance is appropriate for use by other Federal agencies and by State agencies with air quality and land management responsibilities. The *Guideline* serves to identify, for all interested parties, those techniques and data bases EPA considers acceptable. The *Guideline* is not intended to be a compendium of modeling techniques. Rather, it should serve as a common measure of acceptable technical analysis when supported by sound scientific judgement.

with receptor models to attribute source (or source category) contributions. Guidance is available for PM-10 sampling and analysis applicable to receptor modeling.[56]

d. Under certain conditions, recommended dispersion models may not be reliable. In such circumstances, the modeling approach should be approved by the Regional Office on a case-by-case basis. Analyses involving model calculations for stagnation conditions should also be justified on a case-by-case basis (subsection 8.2.8).

e. Fugitive dust usually refers to dust put into the atmosphere by the wind blowing over plowed fields, dirt roads or desert or sandy areas with little or no vegetation. Re-entrained dust is that which is put into the air by reason of vehicles driving over dirt roads (or dirty roads) and dusty areas. Such sources can be characterized as line, area or volume sources. Emission rates may be based on site specific data or values from the general literature. Fugitive emissions include the emissions resulting from the industrial process that are not captured and vented through a stack but may be released from various locations within the complex. In some unique cases a model developed specifically for the situation may be needed. Due to the difficult nature of characterizing and modeling fugitive dust and fugitive emissions, it is recommended that the proposed procedure be cleared by the Regional Office for each specific situation before the modeling exercise is begun.

6.2.3 Models for Carbon Monoxide

a. Guidance is available for analyzing CO impacts at roadway intersections.[57] The recommended screening model for such analyses is CAL3QHC.[58,59] This model combines CALINE3 (listed in Appendix A) with a traffic model to calculate delays and queues that occur at signalized intersections. The screening approach is described in reference 57; a refined approach may be considered on a case-by-case basis with CAL3QHCR.[60] The latest version of the MOBILE (mobile source emission factor) model should be used for emissions input to intersection models.

b. For analyses of highways characterized by uninterrupted traffic flows, CALINE3 is recommended, with emissions input from the latest version of the MOBILE model.

c. For urban area wide analyses of CO, an Eulerian grid model should be used. Information on SIP development and requirements for using such models can be found in several references.[57,61,62,63]

d. Where point sources of CO are of concern, they should be treated using the screening and refined techniques described in Section 4.

6.2.4 Models for Nitrogen Dioxide (Annual Average)

a. A tiered screening approach is recommended to obtain annual average estimates of NO_2 from point sources for New Source Review analysis, including PSD, and for SIP planning purposes. This multi-tiered approach is conceptually shown in Figure 6-1 and described in paragraphs b through d of this subsection:

FIGURE 6-1

Multi-tiered Screening Approach for Estimating Annual NO_2 Concentrations from Point Sources

Tier 1:	Assume Total Conversion of NO to NO_2
	↓
Tier 2:	Multiply Annual NO_x Estimate by Representative Equilibrium NO_2 / NO_x Ratio (e.g., 0.75 National Default Ratio)
	↓
Tier 3:	Detailed Analysis on Case-by-Case Basis

b. For Tier 1 (the initial screen), use an appropriate model in subsection 4.2.2 to estimate the maximum annual average concentration and assume a total conversion of NO to NO_2. If the concentration exceeds the NAAQS and/or PSD increments for NO_2, proceed to the 2nd level screen.

c. For Tier 2 (2nd level) screening analysis, multiply the Tier 1 estimate(s) by an empirically derived NO_2/NO_X value of 0.75 (annual national default).[64] The reviewing agency may establish an alternative default NO_2/NO_X ratio based on ambient annual average NO_2 and annual average NO_X data representative of area wide quasi-equilibrium conditions. Alternative default NO_2/NO_X ratios should be based on data satisfying quality assurance procedures that ensure data accuracy for both NO_2 and NO_X within the typical range of measured values. In areas with relatively low NO_X concentrations, the quality assurance procedures used to determine compliance with the NO_2 national ambient air quality standard may not be adequate. In addition, default NO_2/NO_X ratios, including the 0.75 national default value, can underestimate long range NO_2 impacts and should be used with caution in long range transport scenarios.

d. For Tier 3 (3rd level) analysis, a detailed screening method may be selected on a case-by-case basis. For point source modeling, other refined screening methods, such as the ozone limiting method,[65] may also be considered. Also, a site specific NO_2/NO_X ratio may be used as a detailed screening method if it meets the same restrictions as described for alternative default NO_2/NO_X ratios. Ambient NO_X monitors used to develop a site specific ratio should be sited to obtain the NO_2 and NO_X concentrations under quasi-equilibrium conditions. Data obtained from monitors sited at the maximum NO_X impact site, as may be required in a PSD pre-construction monitoring program, likely reflect transitional NO_X conditions. Therefore, NO_X data from maximum impact sites may not be suitable for determining a site specific NO_2/NO_X ratio that is applicable for the entire modeling analysis. A site specific ratio derived from maximum impact data can only be used to estimate NO_2 impacts at receptors located within the same distance of the source as the source-to-monitor distance.

e. In urban areas (subsection 8.2.3), a proportional model may be used as a preliminary assessment to evaluate control strategies to meet the NAAQS for multiple minor sources, *i.e.*, minor point, area and mobile sources of NO_X; concentrations resulting from major point sources should be estimated separately as discussed above, then added to the impact of the minor sources. An acceptable screening technique for urban complexes is to assume that all NO_X is emitted in the form of NO_2 and to use a model from Appendix A for nonreactive pollutants to estimate NO_2 concentrations. A more accurate estimate can be obtained by: (1) Calculating the annual average concentrations of NO_X with an urban model, and (2) converting these estimates to NO_2 concentrations using an empirically derived annual NO_2/NO_X ratio. A value of 0.75 is recommended for this ratio. However, a spatially averaged alternative default annual NO_2/NO_X ratio may be determined from an existing air quality monitoring network and used in lieu of the 0.75 value if it is determined to be representative of prevailing ratios in the urban area by the reviewing agency. To ensure use of appropriate locally derived annual average NO_2 / NO_X ratios, monitoring data under consideration should be limited to those collected at monitors meeting siting criteria defined in 40 CFR Part 58, Appendix D as representative of "neighborhood", "urban", or "regional" scales. Furthermore, the highest annual spatially averaged NO_2/NO_X ratio from the most recent 3 years of complete data should be used to foster conservatism in estimated impacts.

f. To demonstrate compliance with NO_2 PSD increments in urban areas, emissions from major and minor sources should be included in the modeling analysis. Point and area source emissions should be modeled as discussed above. If mobile source emissions do not contribute to localized areas of high ambient NO_2 concentrations, they should be modeled as area sources. When modeled as area sources, mobile source emissions should be assumed uniform over the entire highway link and allocated to each area source grid square based on the portion of highway link within each grid square. If localized areas of high concentrations are likely, then mobile sources should be modeled as line sources using an appropriate steady-state plume dispersion model (*e.g.*, CAL3QHCR; subsection 6.2.3).

g. More refined techniques to handle special circumstances may be considered on a case-by-case basis and agreement with the appropriate reviewing authority (paragraph 3.0(b)) should be obtained. Such techniques should consider individual quantities of NO and NO_2 emissions, atmospheric transport and dispersion, and atmospheric transformation of NO to NO_2. Where they are available, site specific data on the conversion of NO to NO_2 may be used. Photochemical dispersion models, if used for other pollutants in the area, may also be applied to the NO_X problem.

6.2.5 Models for Lead

a. For major lead point sources, such as smelters, which contribute fugitive emissions and for which deposition is important, professional judgement should be used, and there should be coordination with the appropriate reviewing authority (paragraph 3.0(b)). To model an entire major urban area or to model areas without significant sources of lead emissions, as a minimum a proportional (rollback) model may be used for air quality analysis. The rollback philosophy assumes that measured pollutant concentrations are proportional to emissions. However, urban or other dispersion models are encouraged in these circumstances where the use of such models is feasible.

b. In modeling the effect of traditional line sources (such as a specific roadway or highway) on lead air quality, dispersion models applied for other pollutants can be used. Dispersion models such as CALINE3 and CAL3QHCR have been used for modeling carbon monoxide emissions from highways and intersections (subsection 6.2.3). Where there is a point source in the middle of a substantial road network, the lead concentrations that result from the road network should be treated as background (subsection 9.2); the point source and any nearby major roadways should be modeled separately using the appropriate recommended steady-state plume dispersion model (subsection 4.2.2).

7.0 Other Model Requirements

7.1 Discussion

a. This section covers those cases where specific techniques have been developed for special regulatory programs. Most of the programs have, or will have when fully developed, separate guidance documents that cover the program and a discussion of the tools that are needed. The following paragraphs reference those guidance documents, when they are available. No attempt has been made to provide a comprehensive discussion of each topic since the reference documents were designed to do that. This section will undergo periodic revision as new programs are added and new techniques are developed.

b. Other Federal agencies have also developed specific modeling approaches for their own regulatory or other requirements.[66] Although such regulatory requirements and manuals may have come about because of EPA rules or standards, the implementation of such regulations and the use of the modeling techniques is under the jurisdiction of the agency issuing the manual or directive.

c. The need to estimate impacts at distances greater than 50km (the nominal distance to which EPA considers most steady-state Gaussian plume models are applicable) is an important one especially when considering the effects from secondary pollutants. Unfortunately, models originally available to EPA had not undergone sufficient field evaluation to be recommended for general use. Data bases from field studies at mesoscale and long range transport distances were limited in detail. This limitation was a result of the expense to perform the field studies required to verify and improve mesoscale and long range transport models. Meteorological data adequate for